

Claims

1. A lithographic process for producing high aspect ratio parts from an epoxy-type negative photoresist comprising the steps of:-
 - (i) irradiating a prebaked masked epoxy-type negative photoresist on a substrate with light at a total energy density of from 18,000 to 35,000mJ/cm²,
 - (ii) post-baking the exposed photoresist at elevated temperature, and
 - (iii) developing the exposed photoresist in a solvent,wherein no more than 15% of the energy density is contributed by light having a wavelength of 400nm or less.
2. A process as claimed in claim 1, in which step (i) is a single irradiation step using an appropriate filter to filter out the desired proportion of light below 400nm.
3. A process as claimed in claim 1, in which step (i) involves multiple exposures, each exposure filtering out a different proportion of light below 400nm.
4. A lithographic process for producing high aspect ratio parts from an epoxy-type negative photoresist comprising the steps of: -
 - (i) irradiating a prebaked masked epoxy-type negative photoresist on a substrate with a high pressure mercury lamp
 - (ii) post-baking the exposed photoresist at elevated temperature, and
 - (iii) developing the exposed photoresist in a solvent,

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wherein at least 20% of the UV light emitted from the mercury lamp having a wavelength of 365nm is filtered out.

5. A process as claimed in claim 4, wherein, the duration of exposure in step (i) is calculated so that the energy density of light at the unmasked surface of the photoresist is from 18,000 to 35,000 mJ/cm².
6. A process as claimed in claim 4 or 5, wherein at least 40% of the 365 nm light is filtered out during step (i).
7. A process as claimed in any one of claims 4 to 6, wherein light below 400nm contributes no more than 15% of the total energy density.
8. A process as claimed in any preceding claim, wherein light below 400nm contributes no more than 10% of the total energy density.
9. A process as claimed in any preceding claim, wherein the photoresist is an octafunctional epoxidised novolac resin.
10. A process as claimed in any preceding claim, wherein the photoresist is 0.7 to 1.5mm thick.
11. A process as claimed in any one of claims 4 to 7, or 8 to 10 when appended to claim 4, in which step (i) is a single irradiation step using an appropriate filter to filter out the desired proportion of light below 365nm.

12. A process as claimed in any one of claims 4 to 7, or 8 to 10 when appended to claim 4 in which step (i) involves multiple exposures, each exposure filtering out a different proportion of light below 365nm.

13. A process as claimed in claim 12, wherein a four step exposure is adopted with the first exposure using no filter, the last exposure filtering all the 365 nm light and the second and third exposures filtering 80% and 90% of the 365nm light respectively.

14. A process as claimed in any preceding claim, wherein step (ii) is carried out at a temperature of at least 60°C.

15. A process as claimed in any preceding claim, wherein the post bake is a two step procedure in which the photoresist is heated to a first temperature and subsequently to a second higher temperature.

16. A process as claimed in any preceding claim, wherein the method includes a step of rinsing the developed photoresist after step (iii) followed by drying.

17. A part fabricated using the process of any preceding claim.

18. A reciprocating microengine comprising a cylinder, piston and crankshaft, one or more of which are fabricated by the process of any one of claims 1 to 16.